Model Study Reach

The study reach is a 137-mi section of the Roanoke River between Roanoke Rapids and Albemarle Sound (fig. 1) and includes the channels in the distributary at the mouth of the river, as well as a 6.7-mi reach of the Cashie River between Sans Souci and the State Highway 45 bridge (fig. 2). Drainage areas and river miles (measured upstream from Albemarle Sound) at key locations are given in table 1.

According to Manooch and Rulifson (1989), flows in the lower Roanoke were first affected by reservoir projects in August 1950 during construction of Kerr Lake, which was completed in 1952. Releases from Roanoke Rapids Lake, completed in 1955, are the principal factor controlling flows in the lower Roanoke River. Nevertheless, local inflows and conditions in Albemarle Sound affect flows in the lower Roanoke.

Table 1.--*Drainage areas and river miles at selected locations*

[--, not applicable]

Location (figs. 1 and 2)	Site number (fig. 2 and table 2)	Drainage area (square miles)	Roanoke River mile
Roanoke River at Roanoke Rapids	--	8,384	137.0
Roanoke River at Scotland Neck	--	8,671	97
Roanoke River at State Highway 11-42 bridge, near Oak city	1	8,813	67
Roanoke River at Hamilton	2	8,886	59.2
Roanoke River at head of Conine Creek	--	--	40.8
Mouth of Conoho Creek	--	120	38.1
Roanoke River at Williamston	3	9,070	36.6
Roanoke River at Jamesville	4	9,250	19.4
Roanoke River at State Highway 45 bridge	12	9,665	3
Roanoke River at mouth	--	9,666	0

According to Krug and others (1990) and Wilder and others (1978), the long-term average annual runoff in the vicinity of the study reach is about 14 in., or 1.03 $ft^3/s/mi^2$. Consequently, the long-term average runoff at Oak City for the 429-mi^2 drainage area between Oak City and Roanoke Rapids is about 440 ft^3/s. The average runoff at Williamston for the 257-mi^2 drainage area between Oak City and Williamston is about 265 ft^3/s. The average runoff at the mouth of the Roanoke River for the 596-mi^2 drainage area between Williamston and the mouth is about 615 ft^3/s.

Approach

A one-dimensional unsteady flow model (Schaffranek and others, 1981) is being implemented to compute flows in the Roanoke River between the State Highway 11-42